

IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

1. (currently amended) A pointing device for moving a pointer shown on a display screen, comprising:

a transparent plate having an outer surface which permits to contact by a surface of an object;

image detecting means for detecting an image of the surface of said object that contacts ~~an~~said outer surface of said plate; and

optical means for forming an image on the outer surface of said plate on a detection plane of said image detecting means,

wherein said pointer is configured to be able to move according to a movement of the image on the outer surface of said plate detected by said image detecting means.

2. (original) A portable information terminal provided with a pointing device according to claim 1, comprising means for detecting a movement of said image detected by said image detecting means and moving said pointer in a direction according to the direction of said detected movement.

3. (original) A portable information terminal provided with a pointing device according to claim 1, comprising means for determining a presence/absence

of movement of the image on the outer surface of said plate detected by said image detecting means and switching a sensing frequency of said image detecting means according to the determination result.

4. (original) The pointing device according to claim 1, comprising light emitting means for emitting light onto the outer surface of said plate.

5. (original) A portable information terminal provided with a pointing device according to claim 4, further comprising:

first means for measuring a reflection factor of said plate on the outer surface from the quantity of light received of said image detecting means and the quantity of light emitted of said light emitting means;

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second means for designating a quantity of light emitted of said light emitting means as a first reference value when the reflection factor measured by said first means falls below a predetermined minimum reference value and adjusting the quantity of light emitted of said light emitting means when the reflection factor measured by said first means exceeds said minimum reference value so that the quantity of light received by said image detecting means becomes a predetermined second reference value which is larger than said first reference value;

third means for detecting a movement of said image detected by said image detecting means and moving said pointer in the direction according to the direction of said detected movement; and

fourth means for determining a presence/absence of movement of said image

detected by said image detecting means, setting said pointing device in an action mode when said movement is detected, moving said pointer in the direction according to the direction of said movement and setting said pointing device in a standby mode when said movement is not detected for a predetermined period of time,

wherein the sensing frequency of said pointing device in said standby mode is smaller than the sensing frequency of said pointing device in said action mode.

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cont 6. (original) The portable information terminal provided with a pointing device according to claim 5, wherein said second means temporarily changes a quantity of light emitted of said light emitting means when the reflection factor measured by said first means falls below a predetermined minimum reference value and designates the quantity of light emitted of said light emitting means as the predetermined first reference value when the quantity of light received of said image detecting means does not change as said quantity of light emitted changes.

7. (original) The portable information terminal provided with a pointing device according to claim 6, wherein said plate of said pointing device allows a pushing operation and comprises at least one operation switch that operates in accordance with said pushing operation.

8. (original) The portable information terminal provided with a pointing device according to claim 7, wherein one of said operation switches is an "Enter"

switch to enter a menu on said display screen indicated by said pointer.

9. (original) The portable information terminal provided with a pointing device according to claim 8,

wherein optical means of said pointing device is a first condensing lens that forms an image on the outer surface of said plate on the detection plane of said image detecting means, and

said image detecting means is an image pick-up element, and there are provided:

a second condensing lens with a focal distance different from that of said first condensing lens; and

means for switching between said first and second condensing lenses and inserting between said plate and said image pick-up element, and

said image pick-up element is configured to be able to pick up images of an object by said second condensing lens at a greater distance than the outer surface of said plate.

10. (original) The portable information terminal provided with a pointing device according to claim 8, wherein optical means of said pointing device is a condensing lens capable of switching between a first focal distance at which the image on the outer surface of said plate is formed on the detection plane of said image detecting means and a second focal distance longer than said first focal distance, and

said image detecting means is an image pickup element and is configured to be able to pick up the image of an object by said image pick-up element at a longer distance than the outer surface of said plate by setting the focal distance of said condensing lens to said second focal distance.

11. (new): A pointing device for moving pointer shown on a display screen, comprising:

a transparent plate having an outer surface which permits contact by a surface of an object;

image detecting means for detecting an image of the surface of said object that contacts said outer surface of said plate;

optical means for forming an image on the outer surface of said plate on a detection plane of said image detecting means;

light emitting means for emitting light onto said outer surface of said plate; and

control means for detecting a change of said image detected by said image detecting means, and to move a pointer in the direction in accordance with the change of said detected image.

12. (new): A pointing device according to claim 11, further comprising a control means for determining a presence/absence of movement of the image on the outer surface of said plate detected by said image detecting means, and switching a sensing frequency of said image detecting means according to the determination result.

13. (new): A pointing device according to claim 1, wherein said optical means is a first condensing lens that forms an image on the outer surface of said plate on the detection plane of said image detecting means, and

said image detecting means is an image pick-up element, and there are provided;

a second condensing lens with a focal distance different from that of said first condensing lens; and

means for switching between said first and second condensing lenses and inserting between the switched condensing lens said plate and said image pick-up element, and

wherein said image pick-up element is configured to be able to pick up images of an object by said second condensing lens at a greater distance than the outer surface of said plate.

14. (new): A pointing device according to claim 11, wherein optical means of said pointing device is a condensing lens capable of switching between a first focal distance at which the image on the outer surface of said plate is formed on the detection plane of said image detecting means and a second focal distance longer than said first focal distance, and

wherein said image detecting means is an image pickup element and is configured to be able to pick up the image of an object by said image pick-up element at a longer distance than the outer surface of said plate by setting the focal

distance of said condensing lens to said second focal distance.

15. (new): A pointing device for moving a pointer shown on a display screen, comprising:

a transparent plate having an outer surface which permits contact by surface of an object, and allows a pushing operation;

image detecting means for detecting an image of the surface of said object that contacts and outer surface of said plate;

optical means for forming an image on the outer surface of said plate on a detection plane of said image detecting means;

light emitting means for emitting light onto the outer surface of said plate;

control means for detecting a change of said image detected by said image detecting means, and to move a pointer in the direction in accordance with the change of said detected image; and

at least one operation switch operable in accordance with a pushing operation of said plate, and structured to operate one of operation switches in accordance with the pushing operation of said plate.

16. (new): A pointing device according to claim 5, wherein one of said operation switches is an "Enter" switch to enter a menu on said display screen indicated by said pointer.

17. (new): A pointing device according to claim 5, wherein said optical

means is a first condensing lens that forms an image on the outer surface of said plate on the detection plane of said image detecting means, and

said image detecting means is an image pick-up element, and there are provided:

a second condensing lens with a focal distance different from that of said first condensing lens, and

means for switching between said first and second condensing lenses and inserting between said plate and said image pick-up element,

wherein said image pick-up element is configured to be able to pick up images of an object by said second condensing lens at a greater distance than the outer surface of said plate.

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18. (new): A pointing device according to claim 5, wherein said optical means is a condensing lens capable of switching between a first focal distance at which the image on the outer surface of said plate is formed on the detection plane of said image detecting means and a second focal distance longer than said first focal distance, and

wherein said image detecting means is an image pickup element and is configured to be able to pick up the image of an object by said image pick-up element at a longer distance than the outer surface of said plate by setting the focal distance of said condensing lens to said second focal distance.
